FlyBy Math™ Alignment
Mathematics Grade Expectations

Standard 7.6: Arithmetic, Number, and Operation Concepts

Grade Expectations	*FlyBy Math*™ Activities
M8: 4 Accurately solves problems involving proportional reasoning (percent increase or decrease, interest rates, markups, or rates); and squares, cubes and taking square or cube roots.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
M8: 7 Estimates and evaluates the reasonableness of solutions appropriate to grade level.	--Predict outcomes and explain results of mathematical models and experiments.

Standard 7.7: Geometry and Measurement Concepts

Grade Expectations	*FlyBy Math*™ Activities
M8: 13 Applies concepts of similarity to determine the impact of scaling on the volume or surface area of three- dimensional figures when linear dimensions are multiplied by a constant factor; to determine the length of sides of similar triangles, or to solve problems involving growth and rate and makes scale drawings.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. --Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.
M8: 15 Measures and uses units of measures appropriately and consistently when solving problems across the content strands. Makes conversions within or across systems. (See Appendix B for benchmark units and equivalences for each grade.)	--Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.

Standard 7.8: Functions and Algebra Concepts

Grade Expectations	*FlyBy Math*™ Activities
M8: 19 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; **and generalizes** a linear relationship (nonrecursive explicit equation); generalizes a linear relationship to find a specific case; **generalizes** a nonlinear relationship using words or[SC] symbols; or	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.

generalizes a common nonlinear relationship to find a specific case.	
M8: 20 Demonstrates conceptual understanding of linear relationships (*y = kx; y = mx + b*) as a constant rate of change by solving problems involving the relationship between slope and rate of change; informally and formally determining slopes and intercepts represented in graphs, tables, or problem situations; or describing the meaning of slope and intercept in context**; and distinguishes between linear relationships (constant rates of change) and nonlinear relationships (varying rates of change)** represented in tables, graphs, equations, or problem situations; or **describes how change in the value of one variable relates to change in the value of a second variable** in problem situations with constant and varying rates of change**.**	--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system. --Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates. --Interpret the slope of a line in the context of a distance-rate-time problem.
M8: 22 Demonstrates conceptual understanding of equality by showing equivalence between two expressions (expressions consistent with the parameters of the left - and right-hand sides of the equations being solved at this grade level) using models or different representations of the expressions, solving formulas for a variable requiring one transformation (e.g., *d = rt; d/r = t*); by solving multistep linear equations with integer coefficients; by showing that two expressions are or are not equivalent by applying commutative, associative, or distributive properties, order of operations, or substitution; and by informally solving problems involving systems of linear equations in a context.	--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system. --Use the distance-rate-time formula to predict and analyze aircraft conflicts.

Standard 7.9: Data, Statistics, and Probability Concepts

Grade Expectations	***FlyBy Math*™ Activities**
M8: 23 Interprets a given representation (line graphs, scatter plots, histograms, or box-and-whisker plots) to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems. (IMPORTANT: *Analyzes data consistent with concepts and skills in M8: 24*.)	--Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes. --Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.
M8: 25 Organizes and displays data using scatter plots to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve	--Choose among tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.

problems; or identifies representations or elements of representations that best display a given set of data or situation, consistent with the representations required in M8: 23. (IMPORTANT: *Analyzes data consistent with concepts and skills in M8: 24*.)	--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.
M8: 28 In response to a teacher - or student-generated question, makes a hypothesis, collects appropriate data, organizes the data, appropriately displays/represents numerical and/or categorical data, analyzes the data to draw conclusions about the questions or hypothesis being tested, and when appropriate makes predictions, asks new questions, or makes a connection to real-world situations. (See also GLEs M24, M25, M29.)	--Conduct simulation and measurement for several aircraft conflict problems. --Represent distance, rate, and time data using tables, line plots, bar graphs, and line graphs. --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.

Standard 2.5: Mathematical Dimensions, Standard 7.10: Mathematical Problem Solving and Reasoning - Applications

Grade Expectations	***FlyBy Math*™ Activities**
M8: 30 Demonstrate understanding of mathematical problem solving and communication through: • **Approach & Reasoning**—The reasoning, strategies, and skills used to solve the problem; • **Connections**—Demonstration of observations, applications, extensions, and generalizations; • **Solution**—All of the work that was done to solve the problem, including the answer; • **Mathematical Language**—The use of mathematical language in communicating the solution; • **Mathematical Representation**—The use of mathematical representation to communicate the solution; and • **Documentation**—Presentation of the solution.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. --Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.